HCFA
IT ARCHITECTURE

VOLUME ONE
IT DIRECTION
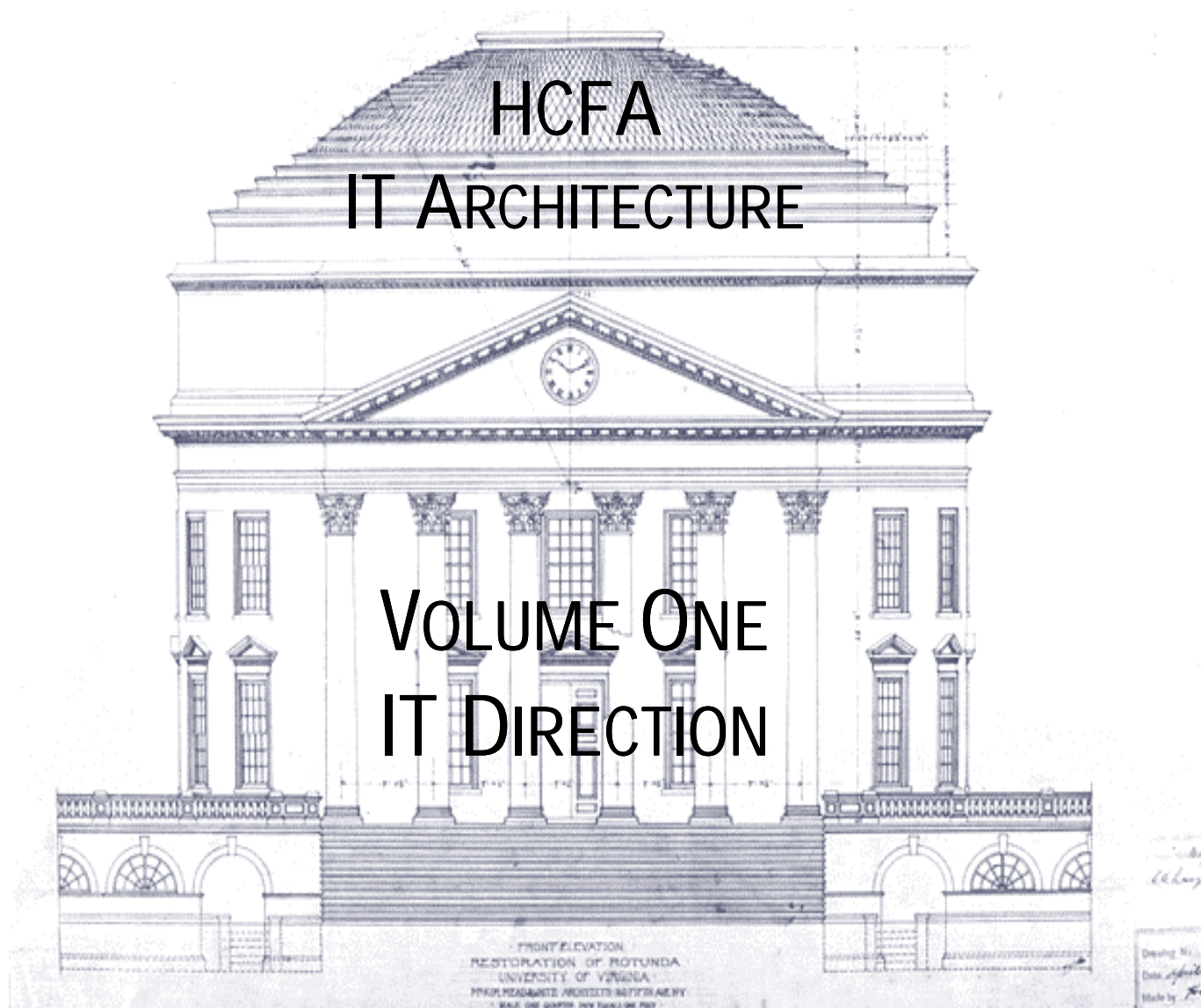
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HCFA
Health Care Financing Administration

IT ARCHITECTURE

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Volume 1   IT Direction

1.1   Introduction

As HCFA moves into the new millennium, it recognizes that its information technology (IT) must be more responsive to the demands of changing business needs. An Information Technology Architecture (ITA) bridges the gap between business needs and IT, and provides a broader context for the intersection of business requirements, technology and market trends, and IT solutions.

This volume, the first in a series of seven ITA volumes, defines and describes the target ITA, its value to HCFA, and its structural components. It also provides an outline of the remaining six volumes, which describe the ITA components in detail and explain the ITA management and governance process.

This document is organized as follows:

- Section 1.2 defines the term *ITA*, discusses the origins of HCFA's ITA initiative, and describes the value of an ITA from an enterprise perspective.
- Section 1.3 discusses HCFA's IT Direction, including the Agency's Business Objectives (enterprise-wide), IT Vision, IT Objectives, and IT Guiding Principles.
- Section 1.4 presents information on HCFA's ITA Staff and a brief history of the ITA effort.
- Section 1.5 discusses the HCFA target ITA, including the ITA components, how these components relate to one another and to the HCFA Business Objectives, and the scope of the ITA.
- Section 1.6 identifies the other six volumes of the ITA document.
- Section 1.7 discusses the "evergreening" concept by which the ITA volumes will be continually updated.
- Section 1.8 presents a feedback form with which readers can provide comments and feedback pertaining to this volume.

1.2   About an Information Technology Architecture

The following sections define the term *ITA*, discuss the origins of HCFA's ITA initiative, and describe the value of an ITA from an enterprise perspective.

1.2.1   Definition

An ITA is "a logically consistent set of principles, policies, and standards that guides the engineering of the organization's IT systems and infrastructure in a way that ensures alignment with business needs."

An ITA is not an IRM (Information Resources Management) plan or strategy. It is one manifestation of the organization's IT strategy, but the strategy also includes the organizational

and resource planning needed to achieve its objectives. ITA should also not be confused with *infrastructure.* Infrastructure is the technical architecture (hardware, software, networks) at a given point in time.

At a very high level, an ITA describes how the enterprise's IT resources are allocated and what types of activities can be conducted, and where. It provides guidance for the infrastructure and applications systems so that everyone can plan the most effective use of resources for the most optimal functioning of the community as a whole.

An enterprise's business strategy represents the business at a high level. It establishes the principles and primary organization that guide the many detailed planning and implementation efforts that combine to realize the strategy. Likewise, an enterprise IT planning effort must also establish the principles and primary structures that will guide and support the individual projects and programs that actually address the details of IT deployment. The architecture, therefore, is defined at a fairly high level of abstraction, making it more adaptable to frequent changes in business processes and supporting technologies.

The development and implementation of an ITA is a relatively new discipline, and practitioners have assigned it various definitions. Sometimes described as a framework or blueprint, sometimes as a set of principles, the ITA is always presented as the document that links business requirements with IT development and investment. Indeed, this concept is at the core of the legislation that directs Federal agencies to develop and implement ITAs.

1.2.2   Clinger-Cohen Act

On July 16, 1996, President Clinton issued Executive Order 13011, titled "Federal Information Technology," to implement the Information Technology Reform Act (ITMRA) of 1996 (also known as the Clinger-Cohen Act).[1] The Clinger-Cohen Act assigns Chief Information Officers (CIOs) the responsibility for "developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture [ITA]" for their agencies. The Act defines an ITA as "an integrated framework for evolving and acquiring new information technology to achieve the Agency's strategic goals and information resource management goals" and states that the ITA must specify the "standards that enable information exchange and resource sharing."

Pursuant to the Clinger-Cohen Act, on October 25, 1996, the Office of Management and Budget issued a memorandum to the Executive Departments and Agencies providing direction regarding investments in major information systems.[2] Included in that guidance were two key

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[1] One Hundred Fourth Congress of the United States of America, National Defense Authorization Act for Fiscal Year 1996, Division E - Information Technology Management Reform, Section 5125, Agency Chief Information Officer, Subsection (a)(1)(b), General Responsibilities (Washington, D.C., 1996)

[2] OMB, Franklin D. Raines Memorandum, 25 October 1996 (OMB 97-02)

concepts applicable to this ITA. OMB directed that IT investments should (1) support core/priority mission functions that need to be performed by the Federal Government, and (2) be consistent with Federal, agency, and bureau information architectures that integrate agency work processes and information flows with technology to achieve the agency's strategic goals; reflect the agency's technology vision and Year 2000 compliance plan; and specify standards that enable information exchange and resource sharing while retaining flexibility in the choice of suppliers and in the design of local work processes.

In order to ensure that HCFA's IT investments support our key mission functions, HCFA's IT Architecture begins with the Business Architecture, which includes the HCFA Strategic Plan goals and objectives and a Business Function Model (BFM). The Business Architecture forms the basis for the remaining components of the architecture. The HCFA IT Architecture is grounded in HCFA's IT Vision (July 1998) and is consistent with the Federal framework for IT architectures. One of our objectives in developing the technology standards contained in this ITA was to promote interoperability across the enterprise while retaining flexibility for systems developers in developing systems and choosing technology suppliers.

On June 18, 1997, OMB defined the three major components of an ITA: (1) the enterprise architecture, consisting of business processes, information flows and relationships, applications, data descriptions, and the technology infrastructure; (2) the Technical Reference Model (TRM); and (3) the Standards Profile.[3]

The TRM and Standards Profile apply to systems applications and the technology infrastructure. The TRM provides a mechanism for understanding how disparate technologies relate to one another. The TRM is not a specific system design but rather the definition of a set of services and interfaces common to an enterprise's information systems. The Standards Profile defines the technology standards to be applied in developing/acquiring systems components.

In recent years, Congress has enacted several statutes to instill a more performance-based approach to the management and accountability of the Federal Government. This statutory framework includes the Government Performance and Results Act; financial management statutes, such as the Chief Financial Officers Act; and information resources management statutes, such as the aforementioned Clinger-Cohen Act. Implemented together, these laws provide a powerful framework for developing and fully integrating information about agencies' missions and strategic priorities, the results-oriented performance goals that flow from those priorities, performance data to show the level of achievement of those goals, and the relationship of IT investments to the achievement of performance goals.

Over the past several years HCFA has recognized the value of developing an enterprise ITA and has set its sights on accomplishing this effort with a sense of urgency. Added to this urgency are the lessons learned from industry best practices, and the need to comply with the requirements set forth in Federal mandates. These drivers, as well as the importance of meeting its IT goals and objectives, have led HCFA to focus on the development of this enterprise ITA. In addition to helping HCFA comply with Federal mandates, a well-planned ITA can facilitate HCFA's achievement of its business goals and adherence to its IT direction.

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[3] OMB, Franklin D. Raines Memorandum, 18 June 1997 (OMB 97-16)

1.2.3   Value of an ITA

The nature of data processing has changed greatly over the years. Today's users have more computing power at their desktops than mainframes had just a decade ago. Each year, new and better applications, software, hardware, and peripherals are being developed. Each advance offers us new opportunities to increase our processing capability and improve service to our customers. But every change we make to part of a system, whether to take advantage of new technologies or to respond to business changes, potentially affects many other parts of the system, and the systems that we build today must be capable of integrating with those that we build tomorrow. Creating an IT environment that is adaptable to such change requires a plan. Such a plan must identify the individual components of the architecture to be used in the development of systems, and must ensure that those components work together for the benefit of the whole.

HCFA's ITA contains a set of standards and guidelines to be used in the technical design of the Agency's information systems. It provides guidance for the selection and implementation of the computing platforms, software, networks, and related products that interconnect our systems and ensure their interoperability. The standards and guidelines in the ITA serve as guideposts for those who make technology-based decisions for HCFA. Rather than resorting to out-of-context, ad hoc studies to facilitate strategic IT decision-making, IT managers can look to the ITA for guidance and direction in capitalizing on the technologies of the future while preserving today's investments. The goal is to enable HCFA to optimize its systems and make the whole greater than the sum of its parts. By encouraging standardization of products and processes that are compatible with the architecture, and by providing guidance to planners, designers, and implementers, the ITA represents a major step toward optimal, cost-effective resource utilization.

The ITA is a tool that can be employed when planning for anticipated changes in hardware and software. When new IT requirements present themselves, users can look to the ITA for guidance in selecting appropriate tools to satisfy those requirements. They can do so with confidence that their selections are compatible with HCFA standards and direction, and that assistance in the acquisition, implementation, and support of those tools will continue to be available.

In addition, the ITA document provides several intrinsic benefits for HCFA, including the following:

- A standard IT vocabulary to facilitate communication;
- Documentation of business functions and processes to increase understanding of how HCFA carries out its mission;
- Business and information models that can be used to assess the impact of change and to measure work; and
- A single source of information about the IT resources (data, applications, platforms) available to users.

The key users of the HCFA ITA will include IT staff, application system managers, and contractors. For management information purposes, this document is also intended for use by HCFA's CIO, the Agency's senior managers, and the DHHS Office of Information Resources Management.

To oversee the implementation of the ITA, HCFA adopted a governance approach that will allow the Agency to integrate the architectural concepts, policies, and standards guidance into HCFA's everyday IT decision-making. Governance formalizes who within HCFA is responsible for making technology decisions and how those decisions are made. HCFA's governance approach consists of two key focus areas:

- *ITA Policy and Standards Approval Process* – Formalizes enterprise-wide acceptance and approval of proposed policies and standards for the acquisition and deployment of IT resources. Ensures that business and technology decisions are made at the appropriate levels of management within HCFA, and promotes consistency in IT decision-making throughout the enterprise. Also provides for the periodic review and reassessment (evergreening) of policies and standards to ensure that the ITA takes into account changes in today's dynamic technology marketplace and remains aligned with HCFA's strategic goals and evolving information systems needs.

- *IT Investment Review Process Support* – Supports HCFA's leadership in its consideration of IT investments by ensuring that required technology analyses are conducted and full resource costing is identified. Provides an enforcement mechanism for ensuring that projects requiring the acquisition and deployment of IT resources do so in a manner consistent with the architecture policies and standards guidance. Ensures compliance with the Clinger-Cohen Act.

The full value of the ITA will be realized once its use has been institutionalized throughout HCFA. We can position ourselves for success by ensuring continuous communication among all stakeholders, clear architectural strategies, and architectural planning. A firm commitment from IT management and from user organizations to adopt and support the ITA is key to its effective implementation and usefulness.

1.3   IT Direction

HCFA's IT Direction is defined by the following key elements:

- Enterprise-wide Business Objectives;
- A contextual framework or IT Vision for transforming the Agency's IT infrastructure;
- IT Objectives defining the tangible benefits of successfully fulfilling the vision; and
- IT Guiding Principles that assist HCFA decision-makers in formulating key IT development and investment decisions.

These elements are discussed briefly below, along with their relationship to one another and to the ITA. The HCFA IT Vision, IT Objectives, and IT Guiding Principles are covered completely in Attachments A, B, and C, respectively. HCFA's Business Objectives are described thoroughly in the HCFA Strategic Plan.

1.3.1   Business Objectives

In the HCFA Strategic Plan, the Agency has identified 13 enterprise-wide Business Objectives across three broad categories.[4] These objectives portray HCFA's business direction and provide the foundation for IT planning activities. The objectives are summarized in Exhibit 1-1 and are discussed further in Volume 2, Business Architecture.

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[4] HCFA, *Health Care Financing Administration Strategic Plan*, September 1998 (Publication No. HCFA-02135)

EXHIBIT 1-1. HCFA BUSINESS OBJECTIVES

CATEGORY	OBJECTIVE	DESCRIPTION
Customer Services		
	CS-1	Improve beneficiary satisfaction with programs, services, and care.
	CS-2	Enhance beneficiary program protections.
	CS-3	Increase the usefulness of communications with beneficiaries.
	CS-4	Increase the usefulness of communications with constituents, partners, and stakeholders.
	CS-5	Ensure that programs and services respond to the health care needs of beneficiaries.
Quality of Care		
	Q-1	Improve health outcomes.
	Q-2	Improve access to services for underserved and vulnerable beneficiary populations.
	Q-3	Protect beneficiaries from substandard care.
Program Administration		
	PA-1	Build a high-quality, customer-focused team.
	PA-2	Enhance program safeguards.
	PA-3	Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds.
	PA-4	Increase public knowledge of the financing and delivery of health care.
	PA-5	Improve HCFA's management of information systems/technology.

1.3.2   IT Vision

At HCFA, as in agencies and companies everywhere, business executives face major challenges in achieving their Business Objectives. Clearly, information plays a major role in providing the answers and insights they need to succeed. Senior executives at HCFA, like their counterparts in other organizations, have consistently voiced their needs with respect to information and IT in the following areas:

- Access to data that is in a useful format and is available where and when needed, and the ability to share that data across HCFA;

- Accurate and consistent (i.e., "reliable") information;

- Ability to adapt quickly to changing business needs; and

- Achievement of all the above at a reasonable, affordable cost.

HCFA's IT Vision was developed in response to these needs. It is a contextual framework for future IT investment at HCFA. It describes an environment in which existing and new systems can work more effectively by sharing information, and in which HCFA can be more responsive to the demands of changing business needs and the promises of emerging technology. HCFA's IT Vision represents a shift from a process-centric paradigm to a focus on information as the foundation of the technology infrastructure. The vision can be characterized as an information-centric model in which:

- Data management is a core function and data is treated as an enterprise asset;
- Individual business functions (such as claims processing, financial audits, or research queries) are supported by modular systems, reusable across programs; and
- All databases are readily accessible to the business functions through the use of standard interfaces.

In the past, HCFA's information-processing operations were defined by the capabilities of existing technology. The focus was on how to adapt business processes to a highly centralized, proprietary technology base. However, in recent years IT has gone through a revolution with the introduction of widely accepted standards; new technologies, particularly in the area of networking; and reduced costs, making once-expensive storage and computing technologies affordable commodities. This revolution now makes it possible and necessary to adapt technology to support best business processes, and not the reverse. The key to controlling costs is managing information as the central element of the overall infrastructure. Such a strategy offers information consumers the most cost-effective and efficient access to reliable information, while freeing resources, enabling each business area to focus on information unique to its operations.

For a more comprehensive discussion of the HCFA IT Vision, refer to Attachment A of this volume.

1.3.3   IT Objectives

To achieve the Business Objectives set forth in the HCFA Strategic Plan, IT initiatives must support the business processes of the organization. The investment in IT requires the exercise of a capital investment process whereby these IT initiatives are evaluated based on criteria relating to the business benefit derived from the investment. HCFA has identified eight key objectives for its IT Direction and architecture. These IT Objectives are summarized below. A more detailed discussion is found in Attachment B, including the rationale for adopting each objective, the implications of adopting each objective, and how the objective is linked to HCFA's Business Objectives.

The HCFA IT Objectives are as follows:

    Objective 1: Meaningful information is readily accessible to HCFA's beneficiaries, partners, and stakeholders.

    Objective 2: The security of those HCFA information assets that support business processes is ensured.

    Objective 3: IT resources are carefully planned and deployed to maintain continuity of service.

    Objective 4: IT support to HCFA's business processes is efficient (efficiency is an internal measure of the cost of doing business).

    Objective 5: IT resources are maneuverable (flexible and adaptable).

    Objective 6: IT is effectively applied to HCFA's business needs (effectiveness is a measure of the value of IT to the business).

    Objective 7: IT is effectively applied to support program integrity.

    Objective 8: IT core competencies of HCFA staff are targeted and strengthened.

Exhibit 1-2 shows the relationship between the enterprise-wide Business Objectives and the IT Objectives.

EXHIBIT 1-2. RELATIONSHIP BETWEEN HCFA'S BUSINESS OBJECTIVES AND IT OBJECTIVES

Business Objectives	IT Objectives	Meaningful information is readily accessible to HCFA's beneficiaries, partners, and stakeholders	The security of those HCFA information assets that support business processes is ensured	IT resources are carefully planned and deployed to maintain continuity of service	IT support to HCFA's business processes is efficient (efficiency is an internal measure of the cost of doing business)	IT resources are maneuverable (flexible and adaptable)	IT is effectively applied to HCFA's business needs (effectiveness is a measure of the value of IT to the business)	IT is effectively applied to support program integrity	IT core competencies of HCFA staff are targeted and strengthened
	Customer Services								
CS-1	Improve beneficiary satisfaction with programs, services, and care.	X			X	X	X		
CS-2	Enhance beneficiary program protections.	X				X	X		
CS-3	Increase the usefulness of communications with beneficiaries.	X				X	X		X
CS-4	Increase the usefulness of communications with constituents, partners, and stakeholders.	X				X	X		X
CS-5	Ensure that programs and services respond to the health care needs of beneficiaries.	X			X	X	X		
	Quality of Care								
Q-1	Improve health outcomes.	X				X	X		X
Q-2	Improve access to services for underserved and vulnerable beneficiary populations.	X				X	X		X
Q-3	Protect beneficiaries from substandard care.	X				X	X		X
	Program Administration								
PA-1	Build a high-quality, customer-focused team.	X				X	X		X
PA-2	Enhance program safeguards.	X	X	X	X	X	X	X	X
PA-3	Maintain and improve HCFA's position as a prudent program administrator and an accountable steward of public funds.	X				X	X	X	
PA-4	Increase public knowledge of the financing and delivery of health care.	X				X	X		
PA-5	Improve HCFA's management of information systems/technology.	X	X	X	X	X	X	X	X

1.3.4   IT Guiding Principles

Architecture is about optimizing the system as a whole, not optimizing the components of the system.

HCFA, in developing and investing in IT, will face many choices driven by legislation, budgetary constraints, and changes in technology. HCFA has identified 15 IT Guiding Principles to aid decision-makers in arriving at these key decisions. These IT Guiding Principles represent the values that will shape HCFA's definition and implementation of its enterprise architecture. A more detailed discussion is provided in Attachment C, including a more complete description, the rationale, and the implications of each principle.

The IT Guiding Principles state that HCFA will:

1. Support a single enterprise-wide ITA;
2. Unify planning, management, and governance of the ITA;
3. Use guidelines consistent with the Federal ITA framework;
4. Maintain a strategic ITA outlook;
5. Develop and implement IT projects using enterprise-wide methodologies;
6. Adopt open systems standards;
7. Enable the automated, active delivery of information across the enterprise;
8. Manage information and data as enterprise-wide assets;
9. Design and develop application software components for reusability and platform independence;
10. Use custom-developed software instead of commercial/government off-the-shelf products only when warranted and justified;
11. Leverage enterprise-wide licensing of vendor products;
12. Promote the use of Web-based technology;
13. Design and deploy application systems using a client/server model;
14. Ensure enterprise-wide integration of IT security; and
15. Deliver centralized IT support services throughout the enterprise.

1.4   The HCFA ITA Staff

In order to better meet HCFA's Business Objectives, IT Objectives, and IT Guiding Principles while adhering to HCFA's IT Vision, HCFA's CIO, Dr. Gary Christoph, undertook the challenge to develop an enterprise ITA. HCFA's CIO is responsible for creating and managing HCFA's enterprise-wide information infrastructure, supporting its business units on technology issues, and providing recommendations to the HCFA executive team on technology policies, sourcing, investments, and resource allocation. It was essential, then, for the CIO to take the lead in the development of an enterprise ITA to support HCFA's strategic business requirements. Under his direction, the ITA Staff developed the ITA and is collectively serving as the steward of the evolving architecture.

In 1998, the HCFA ITA Staff created a baseline of the existing HCFA IT environment. This baseline was documented in the "Information Technology Architecture Current Assessment," released on August 13, 1998. Developed with input received primarily from the OIS and OICS organizations, this document provides valuable insights about the current HCFA IT environment. The current assessment includes the following:

- High-level representation of HCFA's business environment (context, strategic goals, legislative mandates, external business drivers, internal strengths and weaknesses);
- Existing information resources;
- Existing application portfolio;
- Existing infrastructure portfolio (inventory of IT hardware and software excluding desktop hardware and software); and
- Existing IT policies.

In August 1998, the ITA Staff began development of the target ITA with participation from staff throughout HCFA. A successful target ITA must have broad awareness within and support from the HCFA business components, as well as the OIS and OICS organizations. Broad HCFA involvement in the ITA is not only vital during the process of developing the target architecture, but is also a critical component of managing the ITA.

Through extensive collaboration with decision-makers throughout HCFA, research into industry best practices, and adherence to HCFA's IT Objectives and Guiding Principles, the ITA Staff is overseeing the development and implementation of the target ITA. But the ITA belongs to all of HCFA, so the key to HCFA's success in developing an ITA that responds to the business is the consistent and active participation of all HCFA components in this ITA initiative.

1.5   About the HCFA Target ITA

The following sections define the HCFA ITA components, framework, and scope.

1.5.1   ITA Components

The target ITA is composed of six distinct, but interrelated, structural components: the IT Direction, Business Architecture, Information Architecture, Application Architecture, Infrastructure Architecture, and Security Architecture. As a whole, these components form an integrated enterprise architecture designed to align IT with HCFA's current and strategic business goals. To oversee the implementation of these components, HCFA adopted a management and governance approach to integrate the architectural concepts, policies, and standards guidance into everyday IT decision-making. Exhibit 1-3 depicts these components.

EXHIBIT 1-3. HCFA'S ITA COMPONENTS

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│                         IT Direction                              │
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│  Architecture ╲ Architecture ╲ Architecture   ╲ Architecture      │
├───────────────────────────────────────────────────────────────────┤
│                                                                   │
│                     Security Architecture                         │
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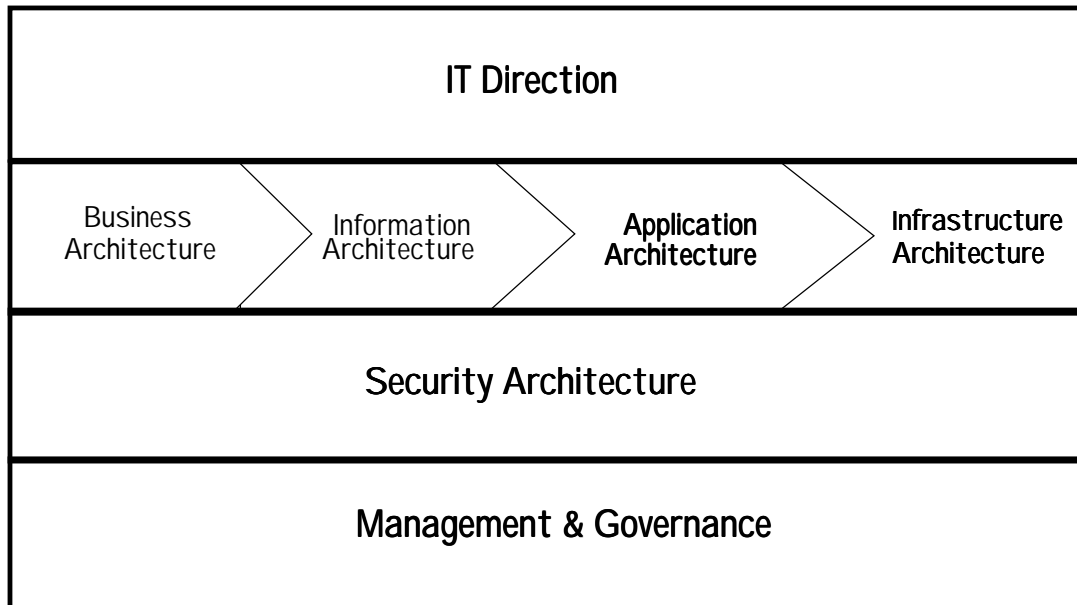
1.5.1.1   IT Direction

Description: HCFA's IT Direction is composed of the Agency's Business Objectives, IT Vision, IT Objectives, and IT Guiding Principles, which collectively provide direction to the IT organization in fulfilling the technology mission in support of the Agency's business goals.

Business Value: The business value of the IT Direction is primarily the articulation of how technology will be used to support Agency business. This articulation consists of providing the Agency's business organizations with information/communication/education, which they can accept or modify. It opens dialogue with these components and should be used to facilitate the partner relationship that is critical between the business and IT organizations.

1.5.1.2   Business Architecture

Description: The Business Architecture describes the state of HCFA's business from an enterprise-wide perspective. It represents the functions and processes that support the business, the organizations that perform the business, the locations where the business is performed, and the factors that could cause the business to change. For any enterprise architecture effort to be successful, it must be linked to the business direction of the organization. The Business Architecture shows this linkage.

Business Value: The Business Architecture serves as the knowledge base for the ITA, helping to tie the business of the organization to its IT by defining what, where, by whom, and why Agency business is performed. In addition to serving as the foundation for the ITA, the Business

Architecture can serve as a stimulus for developing detailed business, budget, and contingency plans for HCFA. It also can be used in performing impact analyses when adapting to changing business needs, and in conducting broad-based reorganizations.

1.5.1.3   Information Architecture

Description: The Information Architecture identifies the major types of information needed to support the business functions defined in the future Business Architecture. It links information behavior, information management processes, and information support staff to other aspects of the HCFA enterprise, such as business processes, organizational structure, and physical location. It also aids in matching information requirements with information resources.

Business Value: The Information Architecture is an essential ITA component, as it promotes an integrated view of HCFA's enterprise information and data resources, and provides the framework for identifying, developing, and evaluating policy needed to effectively manage and protect those resources. It promotes a common vocabulary for discussing and understanding HCFA's information usage and future needs; identifies HCFA's data and information assets and their means of access; and facilitates an environment in which technology enables the transformation of data and information into business knowledge.

1.5.1.4   Application Architecture

Description: The Application Architecture guides the design and development of business applications that provide enterprise information access. It identifies the policies, standards, and preferred tools for application development. The Application Architecture defines how applications are designed, how they cooperate with one another, and where they reside within the hardware, software, and communications network infrastructure. It recommends the orderly grouping of applications around the business processes they support and the data and information they maintain. The Application Architecture provides a conceptual view of the preferred logical components of an application, and offers specific design guidance in the development of these components in order to create adaptable applications that are more modular in scope. It describes how to develop applications that are "component-ized," service oriented, and can easily be integrated to work in a cooperative fashion under a distributed processing, client/server design model. Applications that are modular in scope enable HCFA to quickly adapt its information systems in response to changes in business requirements, operational needs, or technology.

Business Value: The Application Architecture guides HCFA's move toward an IT environment whereby applications are more adaptable to change, the maintenance of applications is less burdensome (consumes fewer resources), and more IT resources are available for new development in response to changing business needs. It defines boundaries for application development, promotes the sharing and reuse of software, optimizes the utilization of the platform infrastructure, and identifies specialized programmer roles.

1.5.1.5   Infrastructure Architecture

Description: The Infrastructure Architecture identifies and describes the hardware, software, and communications network technologies required to manage business applications throughout HCFA's enterprise. It is the lowest layer in the information technology architecture hierarchy and is driven by the business requirements and the design of the three higher architectural layers (Business, Information, and Application). The Infrastructure Architecture provides a Technical Reference Model — a taxonomy for organizing and describing technologies to be used within HCFA's enterprise for the design and development of information systems. It also identifies policies and standards for deploying the hardware, software, and network technologies required to support HCFA's business applications.

Business Value: The Infrastructure Architecture establishes enterprise standards for all technologies used for application development/deployment and information access within HCFA. Management and technology policies and standards allow HCFA to manage the insertion of new technology and the retirement of obsolete technology within the infrastructure, and to leverage the use of technology to maximize its benefits, contain costs, and better control the Agency's technology destiny.

1.5.1.6   Security Architecture

Description: The Security Architecture identifies and defines the major security services that are needed to protect the enterprise business functions, processes, information, and application systems defined in the HCFA ITA. It provides a high-level framework within which to identify enterprise security policies and manage the distribution, use, and administration of security services throughout the enterprise.

Business Value: The Security Architecture helps to ensure the implementation of an enterprise-wide approach to security in the design, development, deployment, and use of information, applications, and infrastructure throughout HCFA in a manner consistent with Federal policies and guidelines.

1.5.1.7   Management and Governance

Description: Governance provides a formal methodology for defining who has the power to make technology decisions and how those decisions should be made. It addresses the problem of decision-making in an environment where IT responsibilities are decentralized, and it deals with the processes needed to manage both the acceptance of the architecture and follow-up assessments and planning.

Business Value: A governance structure determines the responsibilities of the various parties involved in IT decision-making and includes a framework for resolving disputes. It balances the common good and individual liberty by defining what is of central importance and what is local. Adherence to this principle will enable HCFA to share responsibility for the deployment, operation, and management of technology with all components and stakeholders. It will also ensure business unit participation in evaluating and making IT investment decisions using consistent criteria, and will maximize the use of IT resources across the enterprise.

1.5.2   The Framework

As previously stated, an ITA is "a logically consistent set of principles, policies, and standards that guides the engineering of the organization's information technology systems and infrastructure in a way that ensures alignment with the business needs."   In order to realize the ITA, six integrated components, referred to as architectures, are used to align HCFA's systems and infrastructure with the Agency's business goals and objectives. These components are the IT Direction, Business Architecture, Information Architecture, Application Architecture, Infrastructure Architecture, and Security Architecture.

These integrated architectures represent an immense accumulation of HCFA business knowledge and information technology capability. In order to develop and manage this body of knowledge, a conceptual framework is necessary to logically classify, organize, and manage these architectural representations of HCFA.

The Zachman Framework was chosen as the means to organize HCFA's body of knowledge. This framework was initially conceptualized by John A. Zachman when he observed that a common understanding of complex systems from the worlds of engineering and manufacturing (e.g., aircraft, automobiles, computers, spacecraft, etc.) was facilitated by a conceptual framework. This framework is based on the reality that there is no single descriptive representation of a complex situation; therefore, multiple perspectives, or views, are required. The framework has received worldwide acceptance as an integrated framework and is consistent with the Federal Enterprise Architecture Framework.[5]

The Zachman Framework is beneficial to the common understanding of complex business operations, as found in government agencies and corporations. As depicted in Exhibit 1-4, HCFA can be viewed with a set of distinct descriptive viewpoints, or abstractions, of any complex Agency situation, business process, or technology. The viewpoints for understanding HCFA as an enterprise are *Strategic*, *Conceptual*, *Logical*, *Physical*, *Situational*, and *Transformational*.

The *Strategic* viewpoint is also referred to as the *Planner's* view. For each of the six architectures, the *Planner's* view considers the overall context of the Agency, which includes HCFA's IT Objectives and Vision (IT Direction), the HCFA Mission, Vision, Goals and Objectives (Business Architecture), and the strategic direction of information usage (Information Architecture).

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[5]   Chief Information Officers Council Federal Enterprise Architecture Framework, Version 1.1, September, 1999

The *Conceptual* and *Logical* viewpoints are the *Owner's* view and the *Architect's* view, respectively. These views provide progressively more detail regarding the HCFA business person's perception of the Agency's business activities (Business Architecture) and information requirements (Information Architecture).

The *Physical* and *Situational* viewpoints are referred to as the *Builder's* view and the *Assessor's* view, respectively. These views, again, provide progressively more detail and are likened to the detailed technical specifications given to the technologists who design and construct automated systems (Application Architecture, Infrastructure Architecture).

The *Transformational* viewpoint is the *Change Agent's* view, where the appropriate roadmaps and migration strategies are articulated in order to identify and carry out appropriate initiatives for the use of new and existing automated business systems and new and existing technical infrastructure. The *Change Agent's* view brings us full-circle to the oft-stated definition of an ITA: "a logically consistent set of principles, policies, and standards that guides the engineering of the organization's information technology systems and infrastructure in a way that ensures alignment with the business needs."

The advantage of the framework is that it enables a focused concentration on selected aspects of Agency activities and supporting technology without losing a sense of the broader HCFA business context. Investment priorities and decisions are thereby facilitated to ensure the alignment of information technology systems and infrastructure acquisition with HCFA's overall business direction and priorities, and the ongoing management of these investments is more easily accomplished.

EXHIBIT 1-4. STRATEGIC ENTERPRISE IT PLANNING FRAMEWORK

Abstraction Level	IT Architecture					
	IT Direction	Business Architecture	Information Architecture	Application Architecture	Infrastructure Architecture	Security Architecture
Strategic Planner's View	- IT Objectives - IT Vision - IT Scope	- HCFA Mission - HCFA Vision - Strategic Plan Goals - Strategic Objectives	- Information Architecture Strategic Direction - High-level Information Needs - Business Information Classification (Subject Areas)			
Conceptual Owner's View	- Guiding Principles	- Business Context Diagram - Business Function Model (BFM) - HCFA Organizational Chart - Functional Area/Function to Organization Matrix - BFM/Strategic Objective Mapping	- Information Model Framework - Information Architecture Features: Owners View - Information Policy Framework - Information Model	- Info Systems Groups to Business Functions Matrix	- Management Policy - Technical Policy	- *Security Functions* - *Security to Organization Matrix* - *Security to Information Matrix* - *Security to Application Matrix* - *Security to Infrastructure Matrix*
Logical Architect's View		- High-Level Business Processes	- Logical Subject Area Databases (Transactional Data Stores) - Metadata Sub-architecture - Decision Support Sub-architecture - Information to Function Matrix - Information to Subject Area Database Matrix - *Enterprise Data Model*	- Business Alignment - Technical Approach - Design Guidance - Policies - Information Systems Groups - System Design Models - Information Systems Groups to Subject Area Databases Matrix - Application Services Model - Application Standards	- Infrastructure Framework (TRM)	- *Security Framework*

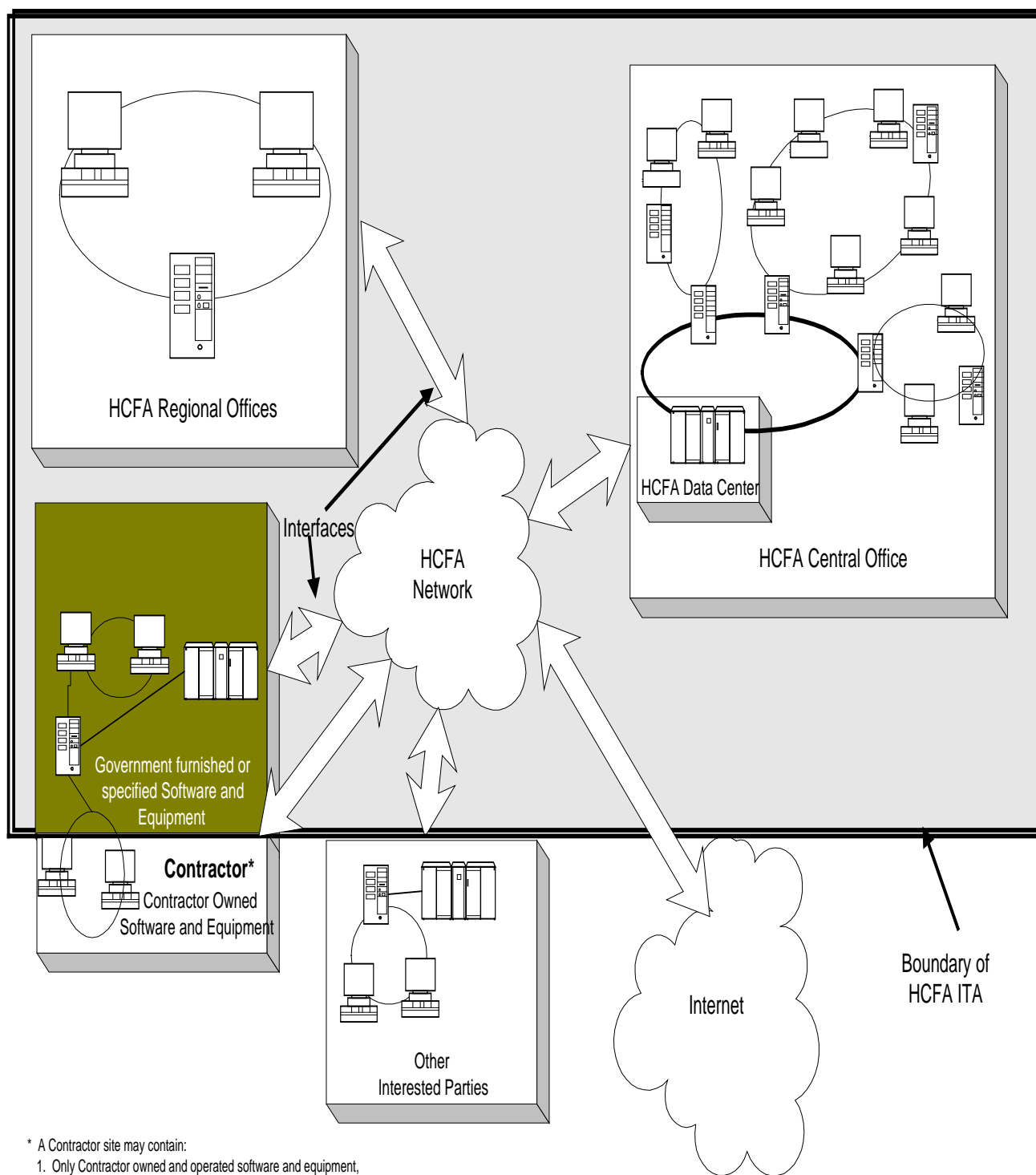| Abstraction Level	IT Architecture					
	IT Direction	Business Architecture	Information Architecture	Application Architecture	Infrastructure Architecture	Security Architecture
Physical Builder's View		- HCFA Physical Organizational Locations	- Design Guidance	- Info Systems Groups to Physical Apps Matrix - Application Templates	- Infrastructure Standards - Configuration Standards	- *Security Standards* - *Security Allocations* - *Security Implementation Designs*
Situational *Assessor's View*	- *Gap Analysis*	- Business Drivers - Business Architecture Modeling Policy Framework	- *Target High-Level Information Needs Assessment*	- *Application Portfolio Assessment* - *Application Portfolio Fact Sheet* - *Methodology Assessment* - *Migration Strategy*	- *Infrastructure Assessment*	- *Security Assessment*
Transformational *Change Agent's View*	- *Migration Strategy*		- *Investment Plans**	- *Investment Plans**	- *Investment Plans**	- *Investment Plans**

Key: Non-italicized text = completed; Italicized text = to be completed in Phase 3.
    * Investment Plans derived from the Migration Strategy; however, they are developed outside of the ITA process.

1.5.3   ITA Scope

Exhibit 1-5 represents the scope of the HCFA ITA. The scope of the ITA is often referred to as the "enterprise." The external boundaries of the graphic shown in Exhibit 1-5 reflect the boundaries of the ITA. If the entities are outside the boundaries, they are not included in the scope of the ITA. Note that in this diagram, the "contractor" box falls across the boundary of the ITA scope. The ITA covers only the Government-owned software and equipment at the contractor sites. There are many external entities that have a relationship with the enterprise. Interface specifications (agreed-upon methods of communicating and sharing information) for these entities are also within the scope of the ITA.

EXHIBIT 1-5. SCOPE OF HCFA'S INFORMATION TECHNOLOGY ARCHITECTURE

HCFA Regional Offices

Interfaces

HCFA Network

HCFA Data Center

HCFA Central Office

Government furnished or specified Software and Equipment

Contractor*
Contractor Owned Software and Equipment

Other Interested Parties

Internet

Boundary of HCFA ITA

* A Contractor site may contain:
   1. Only Contractor owned and operated software and equipment,
   2. Only Government owned software and equipment -- Contractor operated, or
   3. Any combination of the above.

1.6   ITA Document Outline

Each component of the target ITA is described in detail in its own separate volume. The volumes describe the interrelationships of HCFA's business functions and its use of IT to support those functions. This volume (Volume 1) described the IT Direction of the ITA and provided an introduction to the subject matter. Volumes 2 through 6 address the remaining components of the ITA:

Volume 2: Business Architecture

Volume 3: Information Architecture

Volume 4: Application Architecture

Volume 5: Infrastructure Architecture

Volume 6: Security Architecture

The final volume, Volume 7, Management and Governance, describes how the ITA will be managed, governed, and updated (see Section 1.7, Evergreening).

1.7   Evergreening

Dramatic technological changes such as the Internet, as well as ongoing technology assessments, may drive architectural updates and adjustments. Agency end-users of the technology may also influence the architecture as technology is applied to their business processes and as new functional requirements are realized. All of these factors contribute to the need for continual updates to this document. Such updates will be completed annually. We call this "evergreening."

1.8 Feedback Form

A key indicator of the success of the ITA is feedback from the readers of this document. It is important that the ITA be responsive to the needs and objectives of those who are responsible for selecting technologies and deploying systems throughout HCFA. Your responses to this feedback form will allow HCFA staff to determine if this important mission of the ITA is being achieved. Please take a moment to complete the form and return it to the address indicated.

Do you feel this document is of value to you?   Yes _____ No _____
Comments:
_____
_____
_____

Are there any topics of discussion that you feel should be added or changed? Yes___ No ___
Comments:
_____
_____

Please provide any other comments that you feel will improve the usability of this document:
_____
_____
_____

Please describe your job function:
_____
_____
_____

Please provide your name, mailing address, and E-mail address:
_____
_____
_____

Thank you for taking the time to provide your feedback on the HCFA ITA. Your comments and ideas are appreciated. Please send your completed form to the following address:

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